

Please type a plus sign (+) inside this box →

Substitute for form 1449A/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(use as many sheets as necessary)

Complete if Known

RECEIVED

MAR 18 2003

Technology Center 2100

Sheet 1 of 3

Application Number 09/675,811
Filing Date September 29, 2000
First Named Inventor Ron CARMEL
Group Art Unit Unassigned
Examiner Name Unassigned
Attorney Docket Number IMMR-056/00US

PTO/SB/08A (08-00)

U.S. PATENT DOCUMENTS

| Examiner Initials* | Cite No. ¹ | U.S. Patent Document | | Name of Patentee or Applicant of Cited Document | Date of Publication of Cited Document MM-DD-YYYY |
|--------------------|-----------------------|----------------------|--------------------------------------|---|--|
| | | Number | Kind Code ² (if known) | | |
| 2 | A1 | 5,785,630 | | Bobick, et al. | 07/28/1998 |
| 2 | A2 | 5,766,016 | | Sinclair et al. | 06/16/1998 |
| 2 | A3 | 5,547,382 | | Yamasaki et al. | 08/20/1996 |
| 2 | A4 | 5,466,213 | | Hogan et al. | 11/14/1995 |
| 2 | A5 | 5,334,027 | | Wherlock | 08/02/1994 |
| 2 | A6 | 5,309,140 | | Everett, Jr., et al. | 05/03/1994 |
| 2 | A7 | 5,299,810 | | Pierce et al. | 04/05/1994 |
| 2 | A8 | 5,275,174 | | Cook | 01/04/1994 |
| 2 | A9 | 5,271,290 | | Fischer | 12/21/1993 |
| 2 | A10 | 5,240,417 | | Smithson et al. | 08/31/1993 |
| 2 | A11 | 5,212,473 | | Louis | 05/18/1993 |
| 2 | A12 | 5,078,152 | | Bond et al. | 01/07/1992 |
| 2 | A13 | 5,038,089 | | Szakaly | 08/06/1991 |
| 2 | A14 | 5,035,242 | | Franklin et al. | 07/30/1991 |
| 2 | A15 | 5,022,407 | | Horch et al. | 06/11/1991 |
| 2 | A16 | 5,019,761 | | Kraft | 05/28/1991 |
| 2 | A17 | 4,934,694 | | McIntosh | 06/19/1990 |
| 2 | A18 | 4,930,770 | | Baker | 06/05/1990 |
| 2 | A19 | 4,891,764 | | McIntosh | 01/02/1990 |
| 2 | A20 | 4,794,392 | | Selinko | 12/27/1988 |
| 2 | A21 | 4,713,007 | | Alban | 12/15/1987 |
| 2 | A22 | 4,708,656 | | de Vries et al. | 11/24/1987 |
| 2 | A23 | 4,599,070 | | Hladky et al. | 07/08/1986 |
| 2 | A24 | 4,581,491 | | Boothroyd | 04/08/1986 |
| 2 | A25 | 4,513,235 | | Acklam et al. | 04/23/1985 |
| 2 | A26 | 4,236,325 | | Hall et al. | 12/02/1980 |
| 2 | A27 | 4,160,508 | | Salisbury, Jr. | 07/10/1979 |
| 2 | A28 | 3,911,416 | | Feder | 10/07/1975 |
| 2 | A29 | 3,903,614 | | Diamond et al. | 09/09/1975 |
| 2 | A30 | 3,902,687 | | Hightower | 09/02/1975 |
| 2 | A31 | 3,623,064 | | Kagan | 11/23/1971 |
| 2 | A32 | 3,517,446 | | Corlyon et al. | 06/30/1970 |
| 2 | A33 | 3,497,668 | | Hirsch | 02/24/1970 |
| 2 | A34 | 3,220,121 | | Cutler | 11/30/1965 |
| 2 | A35 | 3,157,853 | | Hirsch | 11/17/1964 |

FOREIGN PATENT DOCUMENTS

| Examiner Initials* | Cite No. ¹ | Foreign Patent Document | | | Name of Patentee or Applicant of Cited Document | Date of Publication of Cited Document MM-DD-YYYY | T ⁶ |
|--------------------|-----------------------|-------------------------|---------------------|--------------------------------------|---|--|----------------|
| | | Office ³ | Number ⁴ | Kind Code ⁵ (if known) | | | |
| 2 | B1 | | 0 349 086 | A1 | Stork Kwant B.V. | 01/03/1990 | |

¹ Unique citation designation number.

² See attached Kinds of U.S. Patent Documents.

³ Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3).

⁴ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document.

⁵ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible.

⁶ Applicant is to place a check mark here if English language Translation is attached.

202 6/10/04

Substitute for form 1449A/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(use as many sheets as necessary)

Complete if Known

Application Number 09/675,811
Filing Date September 29, 2000
First Named Inventor Ron CARMEL
Group Art Unit Unassigned
Examiner Name Unassigned
Attorney Docket Number IMMR-056/00US

RECEIVED

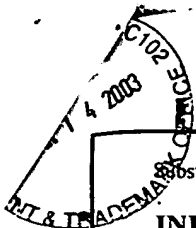
MAR 18 2003

Technology Center 2100

Sheet 2 of 3

OTHER PRIOR ART - NON PATENT LITERATURE DOCUMENTS

| Examiner Initials* | Cite No. ¹ | Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published. | T ² |
|--------------------|-----------------------|---|----------------|
| | C1 | Balgrie, "Electric Control Loading - A Low Cost, High Performance Alternative," <i>Proceedings of Interservice/Industry Training Systems Conference</i> , pp. 247-254, November 6-8, 1990 | |
| 22 | C2 | Iwata, "Pen-based Haptic Virtual Environment," 0-7803-1363-1/93 IEEE, pp. 287-292, 1993 | |
| | C3 | Russo, "The Design and Implementation of a Three Degree of Freedom Force Output Joystick," <i>MIT Libraries Archives</i> pp. 1-131, May 1990, archived 8/14/90 | |
| | C4 | Brooks et al., "Hand Controllers for Teleoperation - A State-of-the-Art Technology Survey and Evaluation," <i>JPL Publication 85-11</i> , NASA-CR-175890; N85-28559, pp. 1-84, 03/1/1985 | |
| 25 | C5 | Jones et al., "A perceptual analysis of stiffness," ISSN 0014-4819 Springer International (Springer-Verlag); <i>Experimental Brain Research</i> , Vol. 79, No. 1, pp. 150-156, 1990 | |
| | C6 | Burdea et al., "Distributed Virtual Force Feedback, Lecture Notes for Workshop on Force Display in Virtual Environments and its Application to Robotic Teleoperation," <i>1993 IEEE International Conference on Robotics and Automation</i> , pp. 25-44, 05/02/1993 | |
| | C7 | Snow et al., "Model-X Force-Reflecting-Hand-Controller," NT Control No. NPO-17851; JPL Case No. 7348, pp. 1-4 with 45 pages of attachments, 06/15/1989 | |
| | C8 | Ouh-Young, "Force Display in Molecular Docking," Doctoral Dissertation, University of North Carolina at Chapel Hill, UMI Order No. 9034744, p. 1-369, 1990 | |
| | C9 | Tadros, "Control System Design for a Three Degree of Freedom Virtual Environment Simulator Using Motor/Brake Pair Actuators," <i>MIT Archive</i> , pp. 1-88, February 1990, archived 8/13/90 | |
| 22 | C10 | Caldwell et al., "Enhanced Tactile Feedback (Tele-Taction) Using a Multi-Functional Sensory System," 1050-4729/93, pp. 955-960, 1993 | |
| | C11 | Adelstein et al., "Design and Implementation of a Force Reflecting Manipulandum for Manual Control research," DSC-Vol. 42, <i>Advances in Robotics</i> , pp. 1-12, 1992 | |
| | C12 | Gotow et al., "Controlled Impedance Test Apparatus for Studying Human Interpretation of Kinesthetic Feedback," WAI1-11:00, pp. 332-337 | |
| | C13 | Stanley et al., "Computer Simulation of Interacting Dynamic Mechanical Systems Using Distributed Memory Parallel Processors," DSC-Vol. 42, <i>Advances in Robotics</i> , pp. 55-61, ASME 1992 | |
| | C14 | Russo, "Controlling Dissipative Magnetic Particle Brakes in Force Reflective Devices," DSC-Vol. 42, <i>Advances in Robotics</i> , pp. 63-70, ASME 1992 | |
| | C15 | Konartins et al., "Display of High-Frequency Tactile Information to Teleoperators," <i>Telemanipulator Technology and Space Telerobotics</i> , Won S. Kim, Editor, Proc. SPIE Vol. 2057, pp. 40-50, Sep. 7-9, 1993 | |
| | C16 | Patrick et al., "Design and Testing of A Non-reactive, Fingertip, Tactile Display for Interaction with Remote Environments," <i>Cooperative Intelligent Robotics in Space</i> , Rui J. deFigueiredo et al. Editor, Proc. SPIE Vol. 1387, pp. 215-222, 1990 | |
| 22 | C17 | Adelstein, "A Virtual Environment System For The Study of Human Arm Tremor," <i>Ph.D. Dissertation</i> , Dept. of Mechanical Engineering, MIT, June 1989, archived 3/13/90 | |
| | C18 | Bejczy, "Sensors, Controls, and Man-Machine Interface for Advanced Teleoperation," <i>Science</i> , Vol. 208, No. 4450, pp. 1327-1335, 1980 | |
| | C19 | Bejczy et al., "Generalization of Bilateral Force-Reflecting Control of Manipulators," <i>Proceedings Of Fourth CISM-IFTOMM</i> , Sep. 8-12, 1981 | |
| | C20 | McAffee et al., "Teleoperator-Subsystem/Telerobot-Demonstrator: Force-Reflecting-Hand-Controller-Equipment Manual," <i>JPL 1988</i> , JPL D-5172 | |
| | C21 | Minsky, "Computational Haptics: The Sandpaper System for Synthesizing Texture for a Force-Feedback Display," <i>Ph.D. Dissertation</i> , MIT, June 1995, archived 7/6/95 | |
| | C22 | Jacobsen et al., "High Performance, Dexterous Telerobotic Manipulator With Force Reflection," <i>Intervention/ROV '91 Conference & Exposition</i> , Hollywood, Florida, May 21-23, 1991 | |
| 22 | C23 | Shimoga, "Finger Force and Touch Feedback Issues in Dexterous Telemanipulation," <i>Proceedings of Fourth Annual Conference on Intelligent Robotic Systems for Space Exploration</i> , Rensselaer Polytechnic Institute, Sep. 30- Oct. 1, 1992 | |
| 22 | C24 | IBM Technical Disclosure Bulletin, "Mouse Ball-Actuating Device With Force and Tactile Feedback," Vol. 32, No. 9B, February 1990 | |
| 22 | C25 | Terry et al., "Tactile Feedback In A Computer Mouse," <i>Proceedings of Fourteenth Annual Northeast Bioengineering Conference</i> , University of New Hampshire, March 10-11, 1988 | |
| 22 | C26 | Howe, "A Force-Reflecting Teleoperated Hand System for the Study of Tactile Sensing in Precision Manipulation," <i>Proceedings of the 1992 IEEE International Conference on Robotics and Automation</i> , Nice, France, May 1992 | |
| 22 | C27 | Eberhardt et al., "OMAR - A Haptic display for speech perception by deaf and deaf-blind individuals," <i>IEEE Virtual Reality Annual International Symposium</i> , Seattle, WA, Sep. 18-22, 1993 | |



Substitute for form 1449A/PTO

**INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**

(use as many sheets as necessary)

Complete if Known

| | | | | | | |
|-------|---|----|---|------------------------|--------------------|--|
| Sheet | 3 | of | 3 | Application Number | 09/675,811 | RECEIVED MAR 18 2003 Technology Center 2100 |
| | | | | Filing Date | September 29, 2000 | |
| | | | | First Named Inventor | Ron CARMEL | |
| | | | | Group Art Unit | Unassigned | |
| | | | | Examiner Name | Unassigned | |
| | | | | Attorney Docket Number | IMMR-056/00US | |

| | | | |
|----------|-----|--|--|
| <u>X</u> | C28 | Rabinowitz et al., "Multidimensional tactile displays: Identification of vibratory intensity, frequency, and contractor area," <i>Journal of The Acoustical Society of America</i> , Vol. 82, No. 4, October 1987 | |
| <u>h</u> | C29 | Bejczy et al., "Kinesthetic Coupling Between Operator and Remote Manipulator," <i>International Computer Technology Conference, The American Society of Mechanical Engineers</i> , San Francisco, CA, August 12-15, 1980 | |
| | C30 | Bejczy et al., "A Laboratory Breadboard System For Dual-Arm Teleoperation," <i>SOAR '89 Workshop</i> , JSC, Houston, TX, July 25-27, 1989 | |
| <u>h</u> | C31 | Ouhyoung et al., "A Low-Cost Force Feedback Joystick and Its Use in PC Video Games," <i>IEEE Transactions on Consumer Electronics</i> , Vol. 41, No. 3, August 1995 | |
| | C32 | Marcus, "Touch Feedback in Surgery," <i>Proceedings of Virtual Reality and Medicine The Cutting Edge</i> , Sep. 8-11, 1994 | |
| | C33 | Bejczy et al., "Universal Computer Control System (UCCS) For Space Telerobots," CH2413-3/87/0000/0318501.00 1987 IEEE, 1987 | |

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ Unique citation designation number.

² Applicant is to place a check mark here if English language Translation attached.

163954 v1/RE
3SS@01!.DOC

Fig 2 6/10/04

* — LINED REFERENCES WERE NOT IN CASE.